In the Title:

Please amend the title as follows:

~~Comma free codes for fast cell search using tertiary synchronization channel~~

<u>Simultaneous Primary, Secondary, and Tertiary Synchronization Codes Over Separate Channels</u>

In the Specification:

Please enter the following replacement paragraphs:

[0022] FIG. 8 <u>is a diagram showing a transmit sequence for secondary and tertiary synchronization codes of the present invention; and FIG. 9</u> is an example of 16 length-16 comma-free codes that may be transmitted as the tertiary synchronization code of the present invention.

[0023] Referring now to FIG. 5, there is a timing diagram of a showing a sequence of fiat, second and third synchronization codes of the present invention. The timing diagram includes a frame of data having a predetermined number of time slots 502,504,506. This predetermined number of time slots preferably includes sixteen time slots in each frame. Each time slot, for example time slot 502 has a duration of 0.625 milliseconds. The time slot is further subdivided into equal symbol time periods. There are preferably ten symbol time periods in time slot 502. A first synchronization code (FSC) 508 is transmitted on a primary synchronization channel during a first symbol time of the time slot. A second synchronization code (SSC) 510 is transmitted on a secondary synchronization channel during the first symbol time of the time slot. A tertiary synchronization code (TSC) 512 is transmitted on a tertiary synchronization channel during the first symbol time of the time slot. Transmission of this tertiary synchronization code is accomplished via a circuit as in FIG. 1 having an additional multiplier circuit similar to circuit 104. This additional multiplier circuit receives the pseudo-noise, (PN) code on lead 109 and a selected tertiary synchronization code and produces a

modulated tertiary synchronization code. Each of the sixteen secondary and tertiary synchronization codes within the frame are preferably different from each other. Sixteen of the comma free codes in a frame form a comma free code word. These synchronization codes are preferably sixteen comma free codes taken from a set or alphabet of seventeen 256-chip short codes. This set of seventeen codes is derived from a (16,2) Reed-Solomon code as is well known in the art. Each of the selected sixteen codes corresponds to a respective time slot of the corresponding data frame. The order of the sixteen selected codes provides 256 combinations or comma free code words, each having a minimum distance of 15. These comma free code words are sufficient to uniquely identify one of sixteen groups of sixteen long codes or scrambling codes transmitted by a base station. A preferred embodiment of the present invention transmits sixteen comma free code sequences from the set $\{SC_1, SC_2, \ldots, SC_{17}\}$ on the secondary synchronization channel. An exemplary embodiment of these sixteen synchronization codes is enumerated in rows of FIG. ~~8~~ 9. The present invention optionally transmits comma free code sequences from the set $\{SC_{18}, SC_{19}, \ldots, SC_{34}\}$ on the tertiary synchronization channel as will be explained in detail.

[0024] Turning now to ~~FIG. 6~~ FIGS. 6 and 8, there ~~is a diagram~~ are diagrams showing a transmit sequence for secondary and tertiary synchronization codes of the present invention. The first row indicates a transmit sequence for $TSC_i=\Phi$ representing a null set of sixteen tertiary synchronization codes. In this configuration, the present invention transmits one of sixteen comma free code words on the secondary synchronization channel corresponding to one of sixteen scrambling code groups. Each length-16 comma free code word identifies a respective scrambling code group. Most wireless

applications are well suited to this configuration of sixteen groups of sixteen long codes or 256 total long codes. This corresponds to a maximum of 256 different base stations that may be received by a mobile receiver. In this configuration, the mobile receiver attempts to match the TSC with a match filter circuit as in FIG. 2. The match filter, however, fails to detect a match with the TSC null set and produces a low-level output signal MAT on lead 288. This low-level MAT signal is compared with a minimum threshold value by a threshold comparator circuit to recognize the TSC null set. In the absence of a TSC signal from the threshold comparator circuit, the mobile receiver performs frame synchronization and matches the SSC code group during second stage acquisition without the TSC. This is highly advantageous in reducing match time and complexity for frame synchronization and SSC code group identification. Moreover, when the number of scrambling codes in the system is small such as 256, no power is allocated to the TSC, thereby increasing system capacity.